

CLAIMS

1. (Amended) A method of manufacturing drawn filaments which comprises heating original filaments supplied from a filament supply means by infrared beams, drawing the filaments to 1000 times or more under a tension provided by the own weight of the filaments and having degree of orientation of 20.8% or more in view of birefringence for the drawn filaments.

2. (Amended) A method of manufacturing drawn filaments which comprises heating original filaments supplied from a filament supply means by infrared beams, drawing the heated filaments to 1000 times or more under a tension of 1 Mpa or less and having degree of orientation of 20.8% or more in view of birefringence for the drawn filaments.

3. (Amended) A method of manufacturing drawn filaments according to claim 1 or 2, wherein original filaments are heated by infrared beams within a range of 8 mm or less

4. [] A method of manufacturing drawn filaments according to claim 1 or 2, wherein the infrared beam is a laser beam.

5. [] A method of manufacturing drawn filaments according to claim 1 or 2, wherein filaments are delivered from a blowing duct before the filaments are heated by infrared beams.

6. [] A method of manufacturing drawn filaments according to claim 1 or 2, wherein a guiding tool for controlling the position of the filaments is disposed before the filaments are heated by infrared beams.

7. [] A method of manufacturing drawn filaments according to claim 1 or 2, wherein the original filaments are any one of polyethylene terephthalate, nylon and polypropylene filaments.

8. (Canceled)

9. [] A method of manufacturing drawn filaments

according to claim 1, 2 or 7, wherein the original filaments have a degree of orientation of 30% or more when measured in view of a birefringence and are drawn with an swelled portion larger than the diameter of the original filaments at the drawing start point.

10. [] A method of manufacturing drawn filaments

according to claim 1 or 2, wherein the obtained drawn filaments have a diameter of 5 μ m or less.

11. [] A method of manufacturing drawn filaments

according to claim 1 or 2, wherein the drawn filaments are heated in a heating zone disposed subsequently.

12. (Canceled)

13. [] A method of manufacturing drawn filaments

according to claim 1 or 2, wherein the drawn filaments are further drawn and then wound up.

14. [] A method of manufacturing non-woven fabrics

comprised of drawn filaments according to claim 1 or 2, wherein the drawn filaments are accumulated on a running conveyor.

15. (Amended) An apparatus for manufacturing drawn filaments

comprising supply device for original filaments, a guiding device to regulate a position of filaments before the original filaments are heated by infrared beams, an infrared beam emitter composed of heating the original filaments within a range or 8 mm or less and means to control a drawing tension, and composing to draw 1000 times or more the original filaments by tension provided by the own weight or tension of 1 Mpa or less.

16. [] An apparatus for manufacturing drawn filaments

according to claim 15, wherein the infrared beam emitter is a laser emitter.

- 1 17. [] An apparatus for manufacturing drawn filaments
2 according to claim 15 or 16, wherein the laser beam is a carbon dioxide gas laser
3 having a power density of 15 W/cm² or more.
- 4 18. [] An apparatus for manufacturing drawn filaments
5 according to claim 15, wherein a heating device having a heating zone is provided
6 to the drawing means and the drawn filaments are heated.
- 7 19. (Canceled)
- 8 20. [] An apparatus for manufacturing drawn filaments
9 according to claim 15, wherein a drawing means is further provided to the
10 apparatus for manufacturing drawn filaments.
- 11 21. (Amended) An apparatus for manufacturing non-woven fabrics
12 comprised of drawn filaments according to claim 15, wherein it is composed that
13 a running conveyor is disposed to the manufacturing apparatus of the drawn
14 filaments, and drawn filaments are accumulated on said conveyor.
- 15 22. (Amended) An apparatus for manufacturing drawn filaments
16 according to claim 15, wherein it is composed that a blowing duct is provided
17 before original filaments are heated with infrared beams and original filaments
18 are delivered through a blowing duct.
- 19 23. (Canceled)
- 20 24. (Canceled)
- 21 25. [] A super microfilament in which the drawn
22 filaments according to claim 1 or 2 are drawn with a swelled portion larger than
23 the starting filament diameter at the drawing start portion.
- 24 26. [] A highly oriented super micro filament in which the
25 drawn filaments according to claim 1 or 2 are nylon 6 or nylon 66 and have the
26 birefringence of 35×10^{-3} or more and the fiber diameter of 5 μ m or less.
- 27 27. [] A highly oriented super micro filament in which the

1 drawn filaments according to claim 1 or 2 are polyethylene terephthalate and
2 have the birefringence of 30×10^{-3} or more and a diameter of $5 \mu\text{m}$ or less.

3 28. ☐ ☐ ☐ A highly oriented super micro filament in which the
4 drawn filaments according to claim 1 or 2 are isotactic polypropylene and have
5 the birefringence of 20×10^{-3} or more and a diameter of $5 \mu\text{m}$ or less.